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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/491,864	01/26/2000	Sergei Tanygin	2493-026	9147

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EXAMINER

FERRIS III, FRED O

ART UNIT	PAPER NUMBER
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2123

DATE MAILED: 06/18/2003

5

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/491,864

Applicant(s)

TANYGIN, SERGEI

Examiner

Fred Ferris

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 April 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 January 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. *Claims 1-22 have been presented for examination based on applicant's arguments filed on 24 April 2003. Claims 1-22 remain rejected.*

Response to Arguments

2. *Applicant's arguments filed 24 April 2003 have been fully considered but they are not persuasive.*

Regarding applicant's response to 112(1) rejection: Applicants have argued that the claimed inventions coordinate systems, other elements, and their combination (i.e. vectors, axes, points) are required to describe the position and motion of rigid bodies in three-dimensional space (e.g., spacecraft orbits, trajectories, and maneuvers) are spatial objects and that, in accordance with page 4, lines 8-9 of the specification, the object of the claimed invention is to provide a method of creating new spatial objects based on pre-existing parent where parent object and target objects are spatial objects. The examiner asserts that the specification does not sufficiently disclose how new spatial objects are "created" or how they are applied to the referenced coordinate systems to describe bodies in three-dimensional space (e.g., spacecraft orbits, trajectories, and maneuvers). For example, some common spacecraft coordinate systems include:

Heliographic Inertial Coordinate System (HGI): The HGI coordinates are Sun-centered and inertially fixed with respect to an X-axis directed along the intersection line of the ecliptic and solar equatorial planes. The solar equator plane is inclined at 7.25 degrees from the ecliptic. This direction was towards ecliptic longitude of 74.367 degrees on 1 January 1900 at 1200 UT; because of precession of the celestial equator, this longitude increases by 1.4 degrees/century. The Z axis is directed perpendicular and northward from the solar equator, and the Y-axis completes the right-handed set. This system differs from

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the usual heliographic coordinates (e.g. Carrington longitudes) which are fixed in the frame of the rotating Sun.

RTN Coordinate System: The RTN system is centered at a spacecraft or planet and oriented with respect to the line connected the Sun and spacecraft or planet. The R (radial) axis is directed radially away from the Sun through the spacecraft or planet. The T (tangential) axis is the cross product of the Sun's spin vector (North directed) and the R axis, i.e. the T axis is parallel to the solar equatorial plane and is positive in the direction of planetary rotation around the Sun. The N (north) axis completes the right handed set. The RTN system is preferable for analyzing solar wind and energetic particle data.

However, neither the claims nor the specification provide any teaching of specifically how one skilled in the art would create new spatial objects based on pre-existing parent objects within these, or any other coordinate system sufficient to allow one skilled in the art (this includes a "rocket scientist") to make and/or use the claimed invention without undue experimentation.

*Applicants have further argued that the specification discloses the "how" of finding of target object in terms of the parent object and the "how" of the building operation obtaining transformation based on parent objects on pages 9-10 of the specification. These statements **simply reiterate** the language of the claims and the alleged teaching in the specification and **do not specifically provide a sufficient teaching to enable one of ordinary skill to make and/or use the claimed process without undue experimentation**. Applicants are reminded that the 112(1) rejections were applied after a critical review of the specification. For example, the referenced passages (page 9-10) refer to the FindIn function but the specification is completely silent on the actual operation of the FindIn function. No flowchart, algorithm, or description is given of specifically how the FindIn function **finds the point object 120 in the existing coordinate system, or, finds that coordinate system object 140 in***

existing objects, or, finds that vector object 150 in existing axes object as stated pages 9-10. Figures 1A-1C and 2A-2D do not disclose these processes sufficiently to allow one skilled in the art to make and/or use the invention without undue experimentation. Accordingly, the examiner maintains the 112(1) rejection of claims 1-22)

Regarding applicant's response to 112(2) rejection: Applicants have argued that the "combined transformation" not vague since it is based on user required input which relates to parent object, default coordinates systems, or sets of axes used for final transformation as defined in the passages on page 5, line 12 of the specification.

The examiner asserts that these passages merely reference "obtaining" a transformation and do not clearly define the user inputs or relationship to the parent objects. In fact, from the written description one skilled in the art would be at odds to determine exactly what the objects represent or exactly what the user inputs are. Accordingly, the examiner maintains the 112(2) rejection of claims 1-22.

Examiner further disagrees with applicant's statement regarding examiners reference to "hierarchical data techniques" and "simple data search techniques". Applicants are reminded that they are claiming limitations relating to finding objects in terms of parent objects which can be likened to well-known hierarchical structures such as parent/child relationships.

Regarding applicant's response to 102(a) rejection: In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., "spatial objects") are not recited

*in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See **In re Van Geuns**, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). It is further noted that independent claims merely broadly claim finding, building, and combining of target objects in terms of parent objects (well-known hierarchical data techniques), and do not specifically recite limitations relating to points, vectors, axes, or coordinate systems. Limitations relating to vectors, points, etc. are recited only in dependent claims and are further inherent in the prior art. The examiner maintains the 102(a) rejection.*

Regarding applicant's response to 102(e) rejection: Applicants have again argued that prior art (Shapiro et al) does not teach "spatial objects". (i.e. limitations that are not specifically recited in the claims) Accordingly, the examiner maintains the 102(e) rejections for the same reasons as cited above.

Regarding applicant's response to objection to the drawings: The examiner acknowledges applicant's response to the objection to the drawings.

Regarding applicant's response to the IDS: The examiner maintains the objection to the specifications listing of references as cited below.

Information Disclosure Statement

3. *The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609 A(1) states, "the*

list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered. For example, the specification makes reference to "Satellite Tool Kit (STK)", "JPL Spice Tool Kit", "Navigator", and "Astogator" which appear to contain information critical to the operation of the claimed invention that has not been disclosed. Hence, these references have not been considered.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 1-22 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The claimed invention appears to be directed toward the creating coordinate systems and primitives (geometrical relationships and coordinate definitions) via a graphical user interface from user inputs, data files, and other numeric means.

The specification indicates that the claimed invention relates to a spacecraft maneuver analyst used to model orbital maneuver phenomena for any possible coordinate system but gives no information on how orbital maneuver models relate to different coordinate systems.

*Per claims 1, 14, 17, 20-22: Independent claims 1, 14, 17, 20-22, for example, are claiming a method and computer system/medium for **creating a target object** based on a **parent object** via a **finding** and **building** operation. However, the specification provides no information on precisely how the claimed invention finds the target object in terms of the parent object, or how the building operation obtains transformation based on parent objects. The specification gives no algorithms, techniques, or adequate description that would allow one skilled in the art to make and/or use the invention.*

*While the specification makes reference to calling the **FindIn function** (pages 9-11) for finding coordinate objects, point objects, vector objects, etc., it gives no information on how the function actually achieves these results sufficient to allow one skilled in the art to make and/or use the invention. In general, the specification reads as a "wish list" of features that could be incorporated into the claimed invention, but provides little information on specifically how these features are realized. Dependent claims inherit this defect.*

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Per claims 1, 14, 17, 20-22: Independent claims 1, 14, 17, 20-22, recite a "combined transformation" which is vague and indefinite. The specification states that a target object is created by a "combined transformation" of parent objects that are realized by a first and second transformation but only vaguely states that the process accomplished using "information explicitly provided by a user" and makes no reference to what information is used or how it is combined.

In general, the claims appear to be more drawn toward the use of popular and well-known hierarchical data techniques (i.e. parent / child relationships, tree traversing, etc.) and simple data search techniques that do not clearly define applicants invention as it relates to the position and motion of bodies in three-dimensional space and spacecraft maneuver analysis. Dependent claims inherit this defect.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application

being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

While the specification for the claimed invention is delinquent in the areas previously cited under 35 U.S.C. 112 rejections, the examiner has applied prior art rejections based on the limited scope of information contained in the specification.

5. Claims 1-22 are rejected under 35 U.S.C. 102(a) as being clearly anticipated by "Modeling Orbiting and Rotating Bodies Using VRML", H.A. Lilly, Alabama School of Mathematics and Science, IEEE 1998

Per claims 1-22: Lilly discloses a computer method for the position and motion of bodies (spacecraft) in three-dimensional space.

Page 1 of Lilly discloses the following:

"the steps to show orbiting, rotating, and tilting bodies including how to create the objects, visually show the paths of the orbits, and set the time length for rotations, tilting of axes, and orbits for bodies. Methods for creating the x, y and z coordinates of orbits using trigonometric functions and the timing for placement of objects are also explained."

Page 3 of Lilly also discloses the following:

"The key word "Transform" is used to create an object or collection of objects. The key word "translation" places the center of the object at the x, y, and z coordinates given, which in the above case is at 0 0 0 or the origin. The key word "children" is used to group objects."

Page 11 of Lilly further discloses the following:

"The color and texture of the satellite are supplied by the file "rock.gif." The "PositionInterpolator" moves objects by translation. As with all interpolators, the "PositionInterpolator" has a key and a keyValue. In the "PositionInterpolator", a set consists of three numbers which are the X, Y, and Z coordinates. The center of the object moves to the X, Y, and Z coordinates at the prescribed time. The numbers in the key specify the **timing** of each movement."

Also see pages 4-9.

Claims 1-22 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by U.S. Patent 6,044,306 issued to Shapiro et al.

*Per claims 1-22: Shapiro discloses a computer method for moving geometric shapes (**objects**) based on position of a **parent** cell (CL23-L59) from a **target** (CL23-L33) and the **transformation** of an **objects coordinates** from one **coordinate system** to another. (CL1-L32-48, CL3-L27, CL5-L27-33, Figs. 9-12)*

Shapiro discloses the following: (CL1-L32-48)

"a shape (a set of points) S with **its own coordinate system** moving in a d-dimensional Euclidean space W with **respect to some global fixed coordinate system**." And "the motion of the shape S can be expressed as a one-parameter set of transformations in the higher-dimensional configuration space C. For the purposes of this invention, the concepts of "transformation" and "motion" are interchangeable and are commonly represented by matrices."

Also see Figures 1, 2, 7, and 8

Conclusion

6. ***THIS ACTION IS MADE FINAL.*** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure, careful consideration should be given prior to applicant's response to this Office Action.

U.S. Patent 6,089,507 issued to Parvez et al teaches spacecraft orbit models and coordinate systems.

U.S. Patent 5,267,167 issued to Glickman teaches satellite orbit and coordinate system transformation.

U.S. Patent 5,109,346 issued to Wertz teaches satellite orbit and coordinate system transformation.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fred Ferris whose telephone number is 703-305-9670 and whose normal working hours are 8:30am to 5:00pm Monday to Friday.

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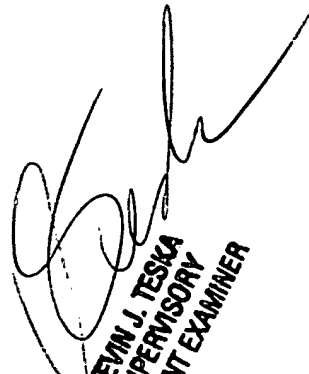
Any inquiry of a general nature relating to the status of this application should be directed to the group receptionist whose telephone number is 703-305-3900.

The Official Fax Numbers are:

After-final	(703) 746-7238
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June 15, 2003



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